



CONSTRUCTION EXPERIENCE

# "TERMINAL 2" & "PIER E", DUBLIN AIRPORT

*Sinéad Hughes*



# POSITION FOR TERMINAL 2 PROJECT

- ✈ 2007 – 2009 Architectural Technician  
Pascall + Watson Architects,  
Terminal 2 Construction Team
- ✈ Part-Time Student, BTech. Construction Technology  
DT133 & DT134
- ✈ Used Terminal 2 Project  
Work Related Project (Dissertation)  
Final Year DT134



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# CONSIDERATIONS FOR NEW TERMINAL

- ✈ Various considerations must be taken into account when proposing a development such as a new airport terminal.
- ✈ All of the associated parties need to be involved and considered during the process.
- ✈ Consideration must be given to the affect that the development would have in the natural landscape of the site, the ecology of the site and the local population and most importantly any undesirable effects of the development should be minimised.



## PROJECT SIZE

- ✈ The terminal 2 building is 75,000 square metres.
- ✈ Pier (E) houses the US Customs, Border and Protection (CBP) facility allowing transatlantic passengers to clear full US Customs and immigration at Dublin Airport - one of two such facilities in Europe. A boarding gate facility with parking spaces for up to 19 long haul and short haul aircrafts and is 25,000 square metres.
- ✈ A new runway was also built 1.7km to the north of the existing main runway costing €150 million to expand the airfield capacity to about 50 million passengers per year.
- ✈ T2 transforms the passenger experience for passengers and raises capacity at the airport to a potential 35 million passengers per year.



# CAPACITY OF DUBLIN AIRPORT

## ✈️ **Late 1930's**

- Planning and development began on the terminal building and grass runways.
- The terminal building was designed to cater for just 100,000 passengers a year.

## ✈️ **January 19<sup>th</sup> 1940**

At 9.00am Dublin Airport was officially opened and 14 Aer Lingus aircraft departed Dublin (Collinstown) for Liverpool.

## ✈️ **1940's**

Europe was at war but Aer Lingus continued to operate flights to Liverpool twice a week.

## ✈️ **1947**

Flights departing from Dublin now ventured as far as Europe.

## ✈️ **1948**

The new concrete runways were completed.



# CAPACITY OF DUBLIN AIRPORT

## ✈ 1950

The airport had been used by 920,000 passengers.

## ✈ 1970's

The terminal building had far exceeded its capacity which was approximately six million passengers annually.

## ✈ 1997

The airport had been used by 10 million passengers.

## ✈ 2007

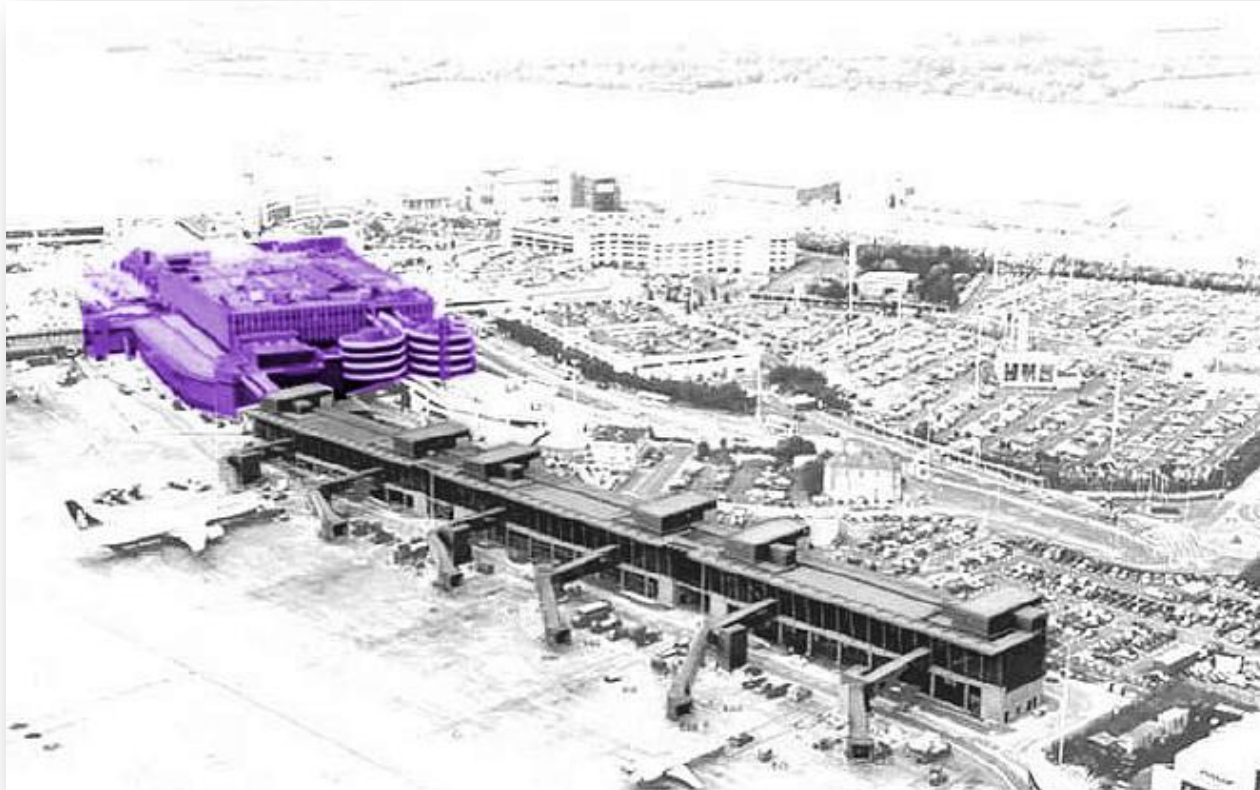
Over 23 million passengers have travelled through Dublin Airport by the end of 2007.

## ✈ 2010

Terminal 2 was completed in November along with additional new piers and major improvements to the existing terminal with passenger traffic forecasted to reach 30 million passengers by 2020.



# TERMINAL 1 ALTERATIONS DEMOLITIONS

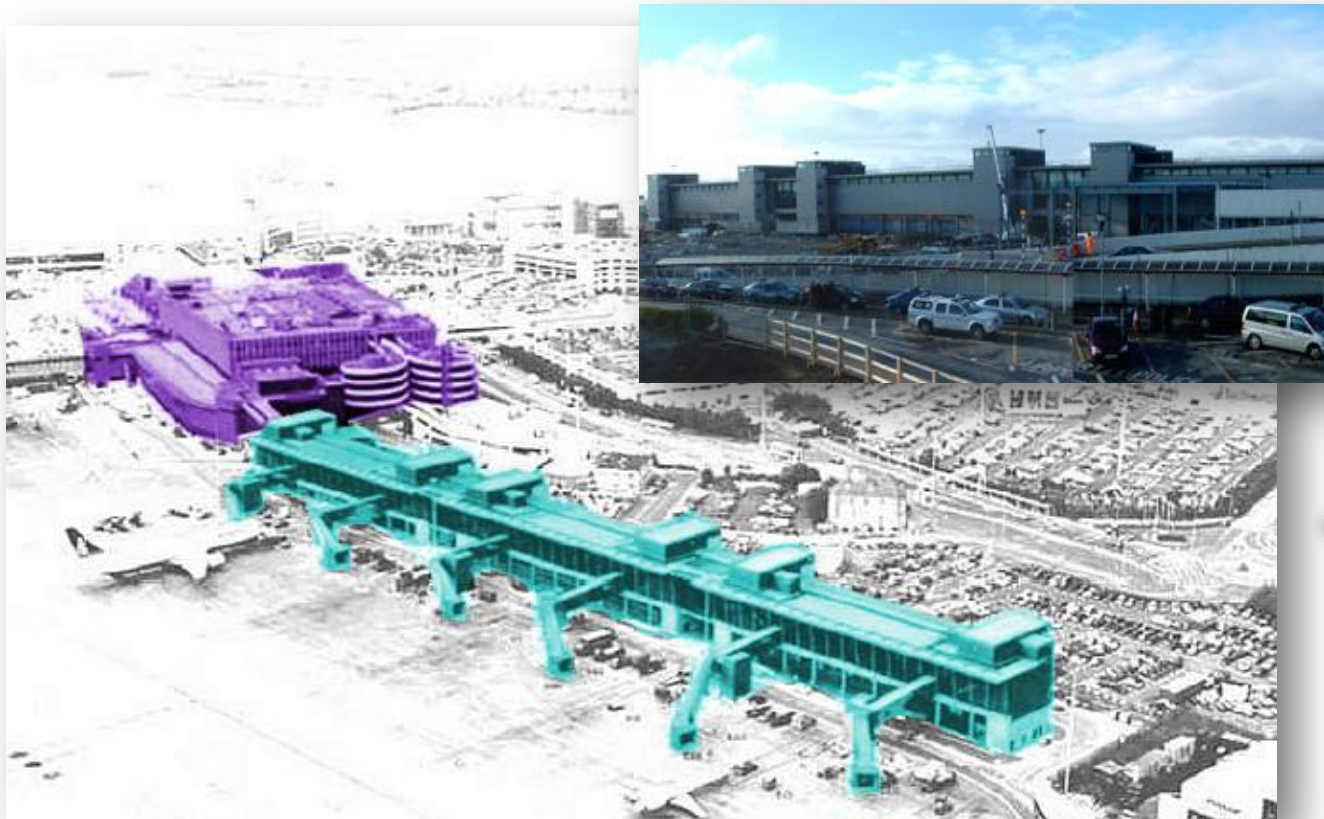


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# TERMINAL 1 ALTERATIONS DEMOLITIONS

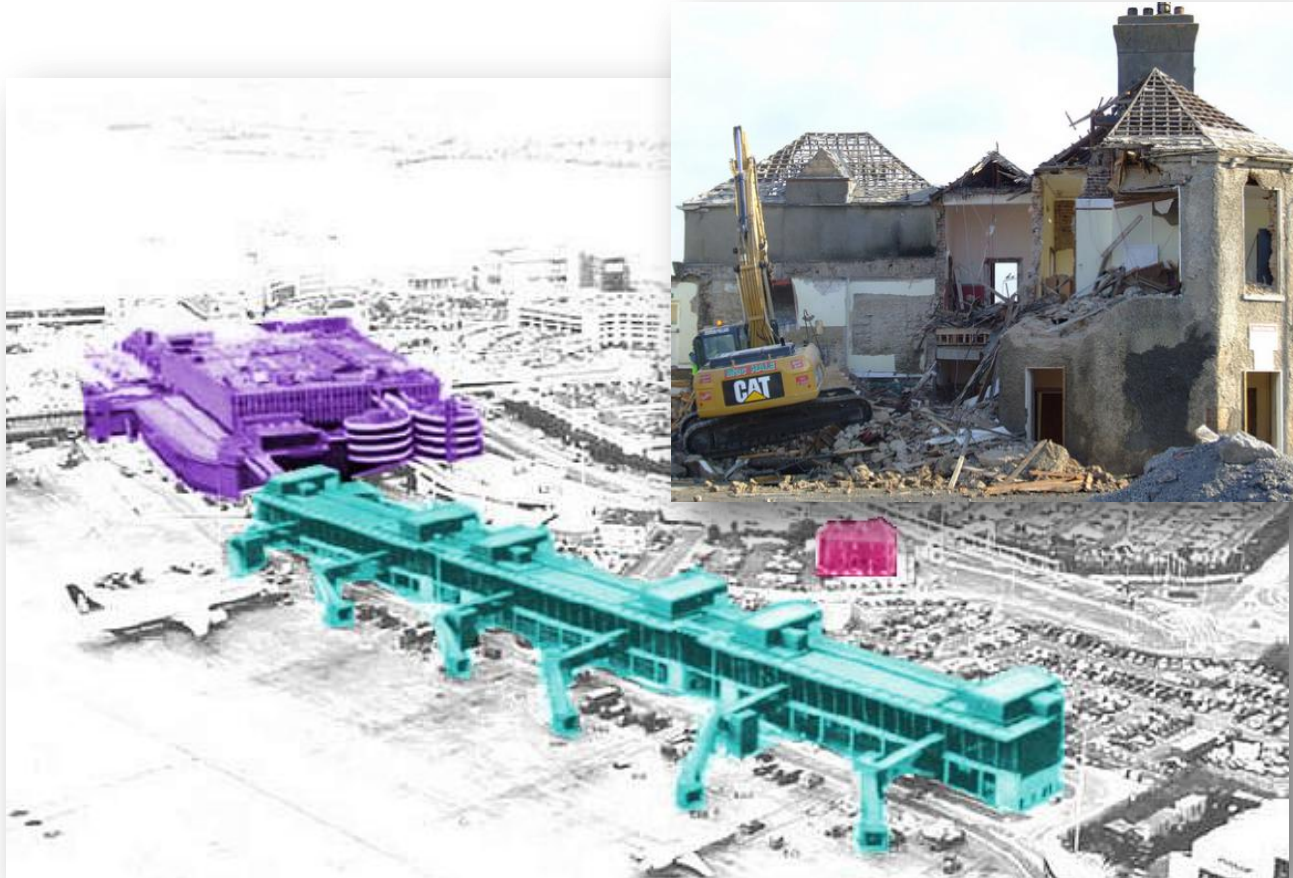
- ✈ Pier C was incorporated into Terminal 2 - Connection between T1 and T2





# TERMINAL 1 ALTERATIONS DEMOLITIONS

- ✈ A new road network to manage the traffic created & the demolition of 18<sup>th</sup> Century Protected Structure Corballis House was granted



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# TERMINAL 2 CONSTRUCTION – MAY 2008

- ✈ First Tower Crane Erected on Terminal 2 Site.
- ✈ Four more large cranes were erected on site over the next few months.
- ✈ Three cranes were located on the southern side of the site to service construction of the energy centre and main passenger processor elements of the new terminal.
- ✈ The other two cranes were located on the northern side of the site to build the Terminal 2 check-in hall.
- ✈ The five cranes, each lifted loads weighing up to six tonnes, they were shared between all of the various contractors and subcontractors.



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# TERMINAL 2 CONSTRUCTION – JUNE 2008

- ✈ T2 Steel erected on site.
- ✈ The curved shape of Terminal visible for the first time.
- ✈ Three huge curved pieces of steel that form the front of the new building were lifted into place. Together they create the curved shape of T2.
- ✈ The curved steel beams were 27m long and each one weights about 14.5 tonnes. The Terminal 2 building first phase contained six of these huge beams.





# TERMINAL 2 CONSTRUCTION – AUGUST 2008



- ✦ Cladding erected on Site.
- ✦ The external walls and the roof of the main terminal building.
- ✦ The cladding for Terminal 2 consists of several separate layers.
- ✦ The first layer of ribbed steel is fixed directly to the steel frame of the terminal and helps give the roof system structural stability.

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# TERMINAL 2 CONSTRUCTION – AUGUST 2008

- ✈ The second layer is a cement-like board that helps with acoustics and provides a surface to apply the next layer.
- ✈ A vapour control layer that helps reduce the risk of condensation inside.
- ✈ Next a layer of foam insulation.
- ✈ A layer of seamed aluminium form the outside walls and roof.
- ✈ An extra layer of Rain Screen Cladding was added in high profile areas of terminal such as the check-in hall and the front of the main terminal building to gave the terminal a more attractive external finish, these are two very thin layers of aluminium with a rubber-like material between them.



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# TERMINAL 2 CONSTRUCTION – SEPTEMBER 2008

- ✈ Glazing erected on Site.
- ✈ Glazing work started on the side of the main terminal building closest to the existing terminal.
- ✈ Glass featured at either end of the main terminal building and was also used throughout the Terminal 2 check-in hall.
- ✈ A Portuguese-Irish consortium comprising Martifer, Mota-Engil and Coffey Construction is responsible for the glazing and the cladding of the new terminal.



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# TERMINAL 2 CONSTRUCTION – NOVEMBER 2008



- ✦ Pier E Construction.
- ✦ Pier E was an exceptionally long building being 4500m in length.
- ✦ This caused the level of the far end of the Pier to have a much higher drop than the top end which is the link to Terminal 2.
- ✦ In order to solve this issue a step in the foundations was created in the centre of Pier E.
- ✦ The step had to be made into a sloping floor for passengers to walk smoothly along with-out becoming a tripping hazard.

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# TERMINAL 2 CONSTRUCTION – FEBRUARY 2009

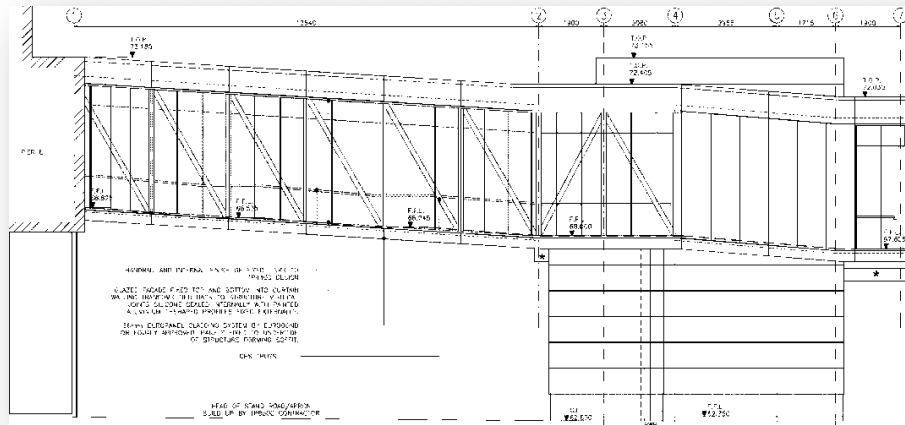


- ✦ Pier E - 11 new Fixed Links (Bridges to Node Building Stairs).
- ✦ Bridges were ramped to match the new Pier levels at each gate.
- ✦ A minimum head height of 4.5m had to be achieved between Apron Level and the bottom of the bridges for airport vehicles to pass underneath. This required some bridges to ramp up to achieve the head height and then back down to match the level of the corresponding gate at Pier E.

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# TERMINAL 2 CONSTRUCTION – FEBRUARY 2009

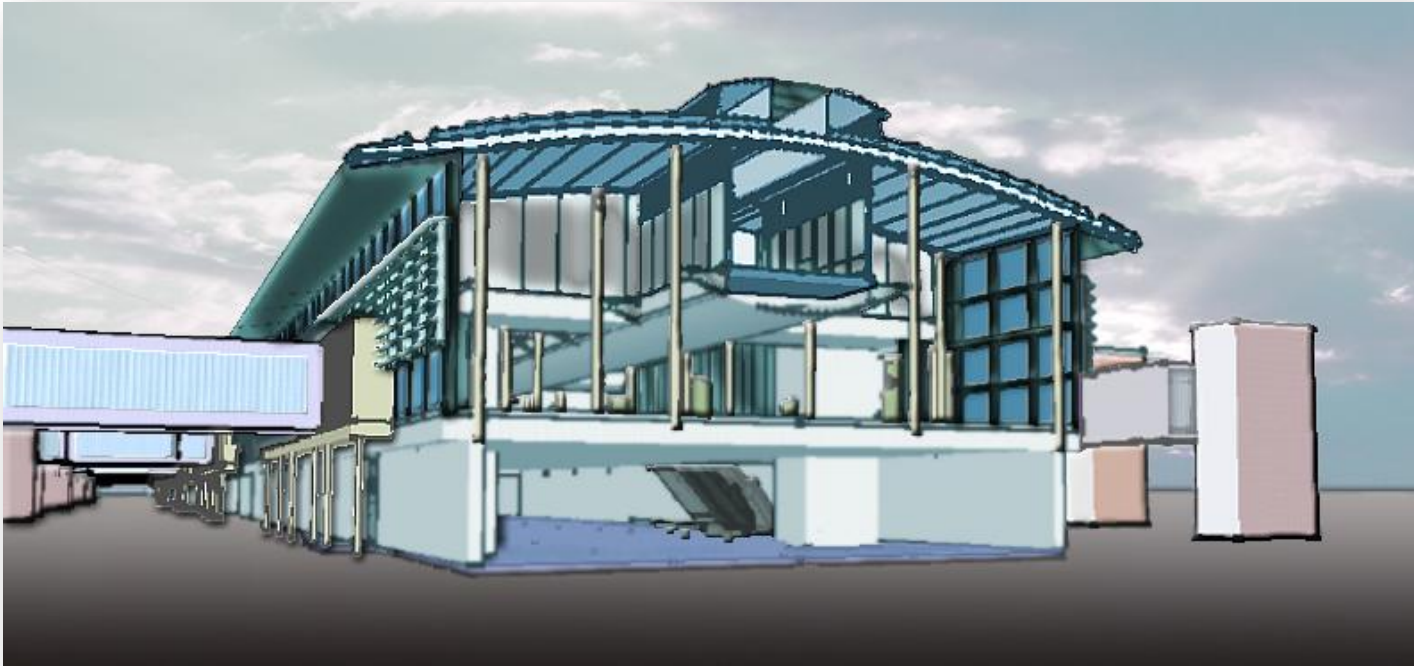


- ✦ During Construction, Node Buildings (Stair Cores) at each Fixed Link didn't comply to the current Fire Regulations and at the new levels, and 8 of these cores required a second stair core to enter Apron level at a different level to the first due to the slight incline.
- ✦ After Team co-ordination meetings it was finally agreed to save money on the project due to the extra expense of the addition of 8 new stair cores, to change the cladding of the Node buildings from *Rain Screen* cladding (Used on the Main Terminal) to *Euro Clad*. This agreement evened the cost.
- ✦ The *Euro Clad* still had the same thermal efficiency and performance as the *Rain Screen* and also took up 50% of the space required for the *Rain Screen*.

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# WORK RELATED PROJECT



- ✦ Google Sketchup was used to create the three-dimensional model.
- ✦ Files were created in Auto CAD and imported into Google Sketchup.
- ✦ The floor plans were drawn in Auto CAD first, and then imported into a Google Sketchup to create the three-dimensional model.
- ✦ Completed model can be exported back into Auto CAD and will appear as a wire frame model in 3D.

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# CONCLUSIONS

- ✈ It is much easier to successfully develop an Airport if all of the effected parties are involved and considered during the entire process.
- ✈ Consideration must be given to the effect that the development would have in the natural landscape of the site, the ecology of the site, and the local population.
- ✈ Undesirable effects of the development must be minimised. This is not applicable to Airport developments alone, but is true of all other major developments in Ireland and/or worldwide.





**QUESTIONS?**



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